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The Spread of Glanders.

Now that the outbreak of foot-and-mouth disease has ceased the Board of Agriculture will have time to attend to other diseases. Swine-fever has declined but glanders is and has for some time been increasing. Every year some human beings lose their lives from glanders infection. Every year about 1500 horses die or are killed through this disease. Its existence is a standing menace to horse-owners, and our Army is in constant danger of infection. The experience of war time in all countries has shown what a serious cause of inefficiency results from glanders.

All these facts we have pressed upon the notice of authorities for years past, and pointed out that so long as glanders was permitted to exist in this kingdom, so sure would our Army horses be re-infected on mobilisation for war. The horses in South Africa have been infected, and we shall only know when the war is over to what extent.

That glanders need not exist—that it might be easily stamped out, has been insisted on by veterinarians for years past. That local authorities would willingly take action is demonstrated by London and Glasgow, in which districts 90 per cent. of the disease prevails. The only hindrance in the way is the Board of Agriculture, which ignores the wishes of local authorities, treats with contempt the opinion of the veterinary profession, and attempts no action on the report of a departmental Committee. This Committee, presided over by Lord Stanley, reported in June, 1899, that the Glanders Order should be amended and that "in-contact" horses in infected stables should be under control. This simple change could be effected in twenty-four hours if the Board of Agriculture cared to act.

In every other disease over which the State has exercised control not only the visibly diseased but also the suspected animals associated with the affected have been provided for. In the case of glanders, although a stud may have been a centre of infection for years, although developed cases are detected every month, although it is certain that half the horses in the stable are infected, no power is given by the Board of Agriculture for local authorities to protect the public by any regulation of the "in-contact" horse.

This seems too ridiculous to be true. It is not only true but it is well known to the Board. It is not only well known but the remedy indicated by the Departmental Committee was objected to by the Assistant Secretary of the Board as "too severe."

That the lives of men and the annual loss of 1,500 horses should be treated in this manner is preposterous. There is no doubt about the facts, and no difficulty as to the remedy. Inaction is due solely to the timidity and ignorance of men who pay no attention to experts nor even to the judicial advice of a special committee.

Foot-and-Mouth Disease in Argentine.

If the report be verified that foot-and-mouth disease has appeared in Buenos Ayres we shall have the importation of stock from that country prohibited. As a very large trade in oxen and sheep now exists this will be a serious matter. Considering the distance, the length of voyage, and the fact that all the stock imported is killed at the port of landing, only the most remote chance of infection exists if the trade be continued.

AN OBSCURE TUMOUR.

By Arthur Whicher, M.R.C.V.S.
Assistant to T. Olver, Esq., M.R.C.V.S.

On January 23rd a lady brought a dachshund bitch here with a swelling on her abdomen, which looked like a mammary tumour. The swelling had been there for some time and was gradually getting bigger.

We did not think it advisable to operate then, so told her to foment the enlargement and let us see it again in a few days time. I may say here that the bitch belonged to the matron of the infirmary. The next we heard of it was from one of the doctors, who told us that at the matron's request he had operated on the bitch.

After administering chloroform (with the assistance of another medical man) and taking the necessary precautions, he commenced to operate, but had no idea as to what he should find. With little difficulty he dissected out the "tumour." When he came to its base he came across a structure which he was quite at a loss as to what it was, so he ligatured it and removed the "tumour." After attending to the bitch he made an incision into the supposed "tumour," and was very much surprised to find it contained a perfectly developed fœtus.

The bitch made a good recovery and at the proper time gave birth to four perfectly healthy pups. The first two came in the usual way, but the third had to be manipulated, and the fourth did not come for some time after the third.

About a week later the bitch seemed so unwell that we were called to see her, but since then has done remarkably well.

ABSTRACTS FROM FOREIGN JOURNALS.

DOURINE, MALADIE DU COIT, OR EQUINE SYPHILIS.

By Surgeon-Major G. Schneider, Bacteriological Laboratory, Military Hospital, Oran, Algeria; and Veterinary-Surgeon M. Buffard, French Army, Oran, Algeria.

(Continued from p. 542.)

Trypanosoma in Experimental Dourine.

Species of Susceptible Animals.

Dourine can be produced by inoculation in the horse, dog, rabbit, rat, mouse or ass, their susceptibility being in the order named.

Fresh blood is the most virulent medium; next, the spinal cord from the portions undergoing softening; the serum; and secretions of the vagina. We would specially point that dourine can be induced even if the material used does not appear to contain any parasites. We would also remark that in certain rare cases blood from which the parasite was apparently absent produced no results. This may be explained by the stages of the disease progressing in waves, and that the moment that the blood was taken was one of abeyance. (*14*).

The trypanosoma can be transmitted:

1. By subcutaneous injection.
2. By contact of virulent matter with the conjunctiva, and in the bitch vagina.
3. By coitus.
4. Inoculation under the meninges.

The duration of the incubative period and the intensity of the symptoms depend entirely on the number of parasites injected. This we have proved many times over in the dog, but we would invite special attention to experiment No. VI. The serum of the horse No. 3 which infected the mare was very rich in parasites, and this accounted for the early appearance of the pathogenic symptoms. Independent of the quantity of infective material, the idiosyncracy of the subject is a factor that must be taken into consideration, as the power of resistance in some is large. Age, also, has to be considered; young dogs succumbing sooner than old, also they manifest the disease in a sub-acute form.

A marked rise in temperature sometimes immediately follows inoculation. The greater the power of resistance of the subject the less marked it is, and it seems to depend on this.

Mice, Rats, Rabbits. The symptoms in these creatures has already been studied by Rouget, and we will only mention certain particulars.

Observation No. 2 shows that the trypanosoma localised for a considerable time in a patch of dry gangrene in the rabbit will cause symptoms of dourine in the horse.

In the rabbit dourine is often accompanied by acute local symptoms—loss of hair over large surfaces, patches of dry gangrene, ulceration of the tissues and exposure of the bones of the cranium, ulcerative keratitis, hypopium, and ophthalmia. In the female, if inoculated in the vagina, the parasite remains localised in the mucous membrane for a long time before other symptoms are observed.

Dogs. In 1892 M. Nocard discovered that dourine could be reproduced in the dog by inoculation into the anterior chamber of the eye with material taken from the spinal cord at one of the points where it was undergoing softening; the animals so inoculated developing paraplegia and great emaciation. In almost all that died there was sclerosis and softening of the cord.

In all our experiments in the dog we observed the identity of the symptoms exhibited with those of dourine, and control experiments confirmed it. A dog inoculated from a horse develops the usual symptoms. A horse inoculated from this dog developed typical dourine with swellings, characteristic patches, and nervous lesions. (Case No.3).

We have used fresh blood or spinal cord to inoculate the dog after satisfying ourselves by microscopic examination that the trypanosoma was present. The matter was injected into the subcutaneous tissue of the abdomen with either a pipette or Pravaz syringe.

Progress of the Disease.

This we have divided into four periods.

1st. Incubative. This is variable from 12 to 20 days; according to the age and power of resistance of the subject. Sometimes inoculation is followed by intense fever, but usually it is not till six to eight days afterwards that the temperature rises, when it varies between 102° and 103°.

2nd period. The first symptom consists in a hot painful swelling, pitted at the centre, with a tense ring of tissue round it, that rises at the point of inoculation. This swelling lasts for about 48 hours, when there is a considerable œdematous infiltration below the abdomen into the scrotum and penis and down the insides of the thighs. There is also acute balanitis.

In the female the œdema is not so great, and is localised in the mammary gland. There is invariably acute inflammation of the urino-genitary mucous membrane, and if the animal is pregnant abortion takes place.

The animal appears uneasy, but remains lying down, frequently licking the vulva. If movement is attempted the gait is unsteady, the back sunk down and very tender on pressure, the least movement causes the patient to cry out with pain. The temterature is between 102-103° F., but appetite remains.

The engorgement on the abdomen and inside the thighs quickly disappear, but that of the sheath and scrotum remains.

3rd period. Emaciation, difficulty in locomotion, localised swellings, and the characteristic patches are the most prominent symptoms.

The emaciation is very rapid, although the appetite remains good. The hind quarters appear to be fixed, and move as if in one piece, the hind limbs being spread apart. When movement is attempted

(14) This fact accounts for the different results that have been obtained by different observers.

the whole of the hind quarters appear to sway from side to side, and the dog moves with difficulty. When the animal is lying and attempts to rise he does it as if he was ascending a stairway. If the hair is shaved off the characteristic circular patches are seen, varying from the size of a florin to that of the palm of the hand. Sometimes these patches are œdematous and sometimes merely thickened skin, but the hairs on the surface are always standing on end. They are seen on the loins and thighs. They remain for two or three days and then disappear, but very often a bald patch remains.

There is often arthritis, with synovitis, opacity of the cornea and cataract, purulent conjunctivitis, ulcerative keratitis and hypopion.

The temperature ranges between 102 and 104° F., the animal is dull but appetite remains good. Certain dogs are more susceptible than others; breed, age, and sex, being factors. Old animals live longer than young ones, and males than females. In all cases there are periods when the patient seems better, but this amendment is only temporary and the issue is almost always fatal. In some cases we have noticed osteoporosis of the bones of the face.

The period of duration of this stage varies; sometimes a month but usually more, according to the susceptibility of the subject.

4th stage—Cachexia. In some cases death is very quick, the animal suddenly becoming paralyzed. More often emaciation becomes extreme, the animal being reduced to a skeleton, refusing all food, and at the least exertion the respiration becoming difficult. Death takes place from syncope.

Post-mortem.—In the female there is always intense inflammation of the genito-urinary mucous membranes.

There is serous infiltration into the subcutaneous tissue of the abdomen and inside of the thighs, absence of fat, and the muscles pale and atrophied, tumefaction of the inguinal glands, and a slight amount of fluid in the abdomen. The lungs and heart are normal, the liver slightly hypertrophied, spleen normal, testicles atrophied, spinal cord in a few cases undergoing softening in the lumbar region.

We have obtained marked lesions of the cord by inoculation with the cord of horses that had become affected with dourine naturally. The fresh cord was macerated in distilled water and injected under the meninges of the brain. The parasite in these cases was detected in the blood a month afterwards.

Equines. Experimental dourine in the ass follows the same course as that naturally acquired, and the same applies to both horse and mare.

Characteristics and Development of the Parasite.

After having demonstrated that artificially induced dourine can be propagated by coitus, we do not intend to enter deeply into the discussion of the reproduction of the trypanosoma. We only briefly describe it as found at the point of inoculation, before and after tumefication takes place.

When there is only a very slight œdematous swelling, in the exudate the following appearances are noticed:

1. Numerous very mobile granules of the same dimensions as we have previously described as being expelled from the parasite in cases of spontaneous dourine. (*Fig. 14*—see p. 541, March 24th.)

2. Stationary refractive corpuscles, either round or ovoid, that may be single, double, or massed together resembling enormous staphylococci, and showing when stained a very dark nucleus. (*Fig. 15*).

3. As in this drawing, they may have a slight amount of motion or be altogether stationary. These are the parasites with several nucleii and the mass of chromatin showing. There are sometimes two or three masses of chromatin disposed on the long axis (*Fig. 3*), each with a nucleus. These masses of chromatin are sometimes in groups of two or four at the anterior portion of the trypanosoma, giving it a globular form. The head sometimes takes the shape of a small point outside the globular part. *Fig. 1 and 2.*

Twenty-four hours after the swelling has ceased to increase in size the following are noticed:

1. The same as above.

2. Single trypanosoma, some short, thick and stationary, without the wrinkled membrane, and the nucleus and mass of chromatin badly defined; others longer and slenderer, the flagellum better developed, with a rudiment of enveloping membrane, and mobile. In these immature forms the nucleus and mass of chromatin are adjacent. (*Fig. 4, 5, 6*).

3. Large pyriform bodies, apparently immobile, with one, two or more appendages with the characteristic of the trypanosoma except the head and beak. These appendages are furnished with flagella, some long and sinuous, others short and curved. They resemble the tentacles of a polypus or cuttle-fish. (*Fig. 7, 8, 9*).

In those that have only one or two appendages (*Fig. 7, 9*) the nuclei are are arranged in a curved line in the same way as the masses of chromatin, and between these masses the protoplasm is of a lighter shade than elsewhere. In those individuals furnished with several appendages the masses of chromatin are distributed in an irregular fashion. (*Fig. 8*).

4. Stationary groups of trypanosoma two, four, or more united together, having, however, their individually definite characteristics, and in different stages of growth. They sometimes are united as a star by junction of their beaks round a central point (*Fig. 12*), sometimes in bundles in which each individual is more or less in contact with its neighbours for the greater or lesser portion of its length. This union is sometimes so intimate that the parasites appear to be bifid assuming the shapes of Y and V. (*Fig. 10 and 11*).

When the temperature rises to its maximum only fully developed parasites are seen, endowed with great mobility and attacking the red blood globules actively. (*Fig. 20*).

During the period that tumefaction is progressing the parasites are found in gradually decreasing numbers; the cycle, however, commences again in a renewed congestion of the tissues.

All the forms of the parasite which we have described develop and pass through the various phases of evolution with the very greatest rapidity, so much so

that it is with difficulty the growth of any single one can be studied, but if these observations are compared with those of Rabinowitsch and Kempner, it is easy to see that the evolution of the parasite of dourine is identical with that of the germ trypanosoma in general, and that of the rat in particular.

No doubt the granules and ovoid corpuscles (*Fig. 14, 15*), and the immature forms (*Fig. 16, 17, 18*), all represent the parasite in different stages of evolution, and show that it has active power of reproduction. We specially draw attention to the development of this parasite in the characteristic patches. Even when there is merely a slight elevation in the skin, blood taken from it will contain numerous specimens; whereas that taken from without it will hold but few if any at all. The greater the size of the patch the fewer the number of parasites, and after the lapse of 24 to 36 hours they are altogether absent, or very rarely seen.

These patches of dourine we consider to have been proved to be caused by the trypanosoma, by the experiment of horse No. 3, inoculated in the neck. As long as the parasites remain localized in the primary patch it remains *in statu quo*, but as soon as they become dispersed secondary ones form.

A characteristic of dourine is its intermittence. After the parasite gains admission to the system the development of the disease proceeds by intermittent stages, and, as shown, the localities attacked vary, and in the intervals the patient appears perfectly healthy, especially before anemia is fully established. In the donkey we have seen the parasite develop in an intermittent fashion at the point of inoculation, but in all probability when it gains access to the circulation it develops in every organ.

When the patches and œdematous swellings subside the trypanosoma is no longer visible.

In the dog, which is a susceptible subject to dourine, the parasite is most abundant in the vessels.

The above noted mobile granules are always coexistent with it, and there is progressive increase in the number of leucocytes, and disintegration of the red corpuscles; these are both characteristic of the disease.

The parasite, sometimes in the adult, sometimes in the immature form, is found in the semen, milk, and mucus from the vagina and urethra. It can be detected in the blood shortly after death but disappears very quickly.

Horses suffering from dourine and experimental animals if re-inoculated, even with large numbers of parasites, do not develop any local lesions at the point of inoculation.

(To be continued.)

From *Recueil de Médecine Vétérinaire*, Feb. 15, 1900.

Joshua A. Nunn, Vet.-Major.

Endoglobular Parasites of the Dog.—Nature of Infectious Icterus of the Dog.—By M. P. Leblanc, Lyons Veterinary College.

The finding of the icteric symptom in sheep bearing hæmatozoa allows us to think of these to explain the nature of infectious jaundice of the dog.

In effect, this disease has all the characters of a marsh fever. It chiefly attacks sporting dogs and up to now no plausible hypothesis has been advanced as to its nature.

The author has examined the blood of a dog affected with malignant infectious jaundice, and found in it a considerable quantity of hæmatozoa greatly analogous to those found in the ox and sheep suffering from hæmoglobinæmia. The examination of the fresh blood has given him the best results. The parasites are fixed upon the red blood corpuscles, but they exist in the plasma in great numbers. The author does not affirm that the disease is due to the presence of the hæmatozoa, because he has not yet been able to make more than one observation, but has very good reason to believe that they play an important, if not unique, *rôle*.—*Société de Biologie*, 20th Jan., 1900.

Piroplasma Canis in Dogs in Senegal.—By Dr. Marchoux.

In 1895 Piana and Galli-Valerio pointed out in the dog, in Italy, the presence of an intraglobular hæmatozoon which, by its form, resembled the *pirosoma bigeminum* (Smith and Kilborne) and which they called *pirosoma bigeminum var. canis*. Koch has seen it in East Africa.

Dr. Marchoux verified its existence, in Senegal, in the blood of eleven dogs, and following the nomenclature adopted by M. Laveran, called it *piroplasma canis*.

The dogs that were the object of this observation did not manifest any other disturbance of health than slight elevation of temperature corresponding to the period when the hæmatozoa were in a great number in the circulation. Not any of them showed jaundice.

On the other hand, if among the dogs previously infected, but in which the minutest microscopical examinations did not enable one to find any parasites in the circulation, fever was occasioned by some means and caused the reappearance of the intraglobular parasites, these dogs passed though the phenomena already pointed out by Nicolle in oxen affected with these parasites, when a fresh infection corresponded to a new growth of the *piroplasma*.

The hæmatozoa in the dog resemble almost point for point those of the ox. They are, however, distinguished from them by a few characters.

At the meeting of January 20th, M. Leblanc pointed out the existence in the dog in France an endoglobular hæmatozoon of which it is regretted that he did not give the description. It would in effect be very interesting to learn if the *piroplasma canis*, which up to the present has only been seen in hot climates, may also exist in our climates, and if its form is found modified.—(*Société de Biologie*, 27th January, 1900).

Piroplasma Canis.—Infectious Jaundice of the Dog.—By M. Leblanc.

The author relates four fresh observations, which leads him to think that in every case of infectious jaundice of the dog the hæmatozoa mentioned in the preceding communication may be encountered. These parasites, spherical or ovoid, are absolutely analogous

to those that Dr. Marchoux has seen in dogs in Senegal.

The method of staining adopted is that recommended by Prof. Laveran, and which gives, it appears, the best results.—*Société de Biologie*, 17th Feb., 1900. (*Ex. Rec. Méd. Vét.*, 15 Mars, 1900).

H. G.

VETERINARY SOCIETIES.

WESTERN COUNTIES' VETERINARY MEDICAL ASSOCIATION.

The annual meeting was held at the New London Hotel, Exeter, on Thursday, March 15th. The President (Mr. W. Penhale) occupied the chair, and there were also present: Professor Stewart Stockman, Edinburgh; and Messrs. Harvey, St. Columb; James, Honiton; W. H. Bloye, Plymouth; Bovett, Bridgwater; and John Dunstan, St. Mellion (hon. sec.)

Telegrams and letters were received from the following members regretting their inability to attend: Messrs. Davey, Crediton: Parsons, Launceston; Golledge, Sherborne; Penhale, Holsworthy; Ascott, Bideford; Bond, Plymouth; Brown, Wiveliscombe; W. B. Nelder, Exeter; Oliver, Devonport.

In the absence of the Hon. Treasurer (Mr. W. B. Nelder), the Hon. Sec. read the annual balance sheet.

Election of Officers.

The Chairman said he was about to propose for the presidency a gentleman who would be accceptable to them all, namely, Mr. Bond, of Plymouth. (Hear, hear). They were all acquainted with him, and they knew the excellent services he rendered last year when he acted as Secretary to the Local Committee for the reception of the National Association at Plymouth. His work won the praise of all on that occasion, and he would fill the presidency of the Western Association with equal success. (Applause)

Mr. Bloye, in seconding, said he well knew the amount of work Mr. Bond did in connection with the Plymouth meeting, and they would get no more able man to fill the chair.

The motion was carried unanimously.

On the motion of Mr. Bovett, seconded by Mr. James, Messrs. Penhale (retiring President), Harvey, Bloye, and Elder were elected vice-presidents for the ensuing year.

A letter was read from Mr. W. B. Nelder tendering his resignation of the post as Hon. Treasurer and his membership of the Association.

The President spoke in euloglstic terms of the excellent work which Mr. Nelder had done on behalf of the Association, and suggested that they should appeal to him to reconsider his decision.

Mr. Bloye moved a resolution embodying the President's suggestion.

Mr. James seconded the motion which was carried unanimously.

On the motion of the President, seconded by Mr. Harvey, Mr. Dunstan was unanimously re-elected Hon. Sec.

The resignation of Mr. Stephens, of Wadebridge, who had gone to South Africa, was accepted.

Mr. Bloye and Mr. Bovett nominated Mr. Brown, of Wiveliscombe, for membership of the Association.

Messrs. W. Ridgman, Liskeard. and Arthur James, Honiton, were unanimously elected members of the Association.

The Hon. Sec. here read some correspondence from the Secretary of the Plymouth branch of the National Association for the Prevention of Tuberculosis in which it was stated that the President for each year of the W.C.V.M.A., would be an ex-officio vice-president of the Plymouth branch.

On the motion of Mr. Harvey, seconded by Mr. Bloye, Plymouth was selected for the next place of meeting in July.

The President, in calling upon Professor Stockman, gave him a cordial welcome. The subject, he said, was an important one, dealing, as it did, with a disease which they were daily meeting with in the West country, and which had baffled them up to the present time. It was particularly prevalent on the Western border of the county, and he hoped they would be able to learn something from such an authority as Professor Stockman, whom they heartily welcomed. (Applause).

THE METHOD OF INFECTION IN BLACK QUARTER.

By Professor Stockman.

Prof. Stockman, who was cordially received, thanked them for the honour they had done him in asking him to address them. The subject of black quarter was one to which he had devoted some attention, although unfortunately he had not had so much experience of it as he should have liked. In many parts of Scotland it had disappeared. He did not want to dwell on the bacillus of black-quarter which had been talked about sufficiently of late. But he would remind them that it was a sporulating microbe, an obligatory anœrobe, and that to a great extent it was saprophytic; that was to say that it lived on dead vegetable material and in the soil. He would first tell them of the virulent material. In animals the bacilli of black quarter were contained mainly in the affected muscle and œdema. A few got into the blood, especially about the time of death, but they were not numerous. It was known that they were in the blood; not that they could be found with a microscope, they were too few in number for that, but if some of the blood were drawn into a sterile tube and then sealed up so as to exclude air, and it was put into an incubator for 12 hours, they would get bubbles and they would find they could make cover glass preparations and cultures. Blood then, although it contained only a few microbes, must be considered as virulent. Everyone knew that when an animal was dead from black-quarter blood often ran from the nostrils and even from the anus. This blood to some extent fell on the floors of the cowsheds, or on the pastures, but the majority of the microbes remained locked up in the muscles, and until the carcass was opened they did not get out. The blood of the animal could have very little to do with the spread of the disease. It had something to do with it, of course, but it was not large unless they opened the carcase and let the microbes free.

This microbe was present in the soil in many districts, and remained there for a considerable time. As he had said it was a saprophytic organism—a facultative parasite. He thoroughly believed that if we were rid of all animals to-morrow we should not be rid of the black-quarter bacillus. It had disappeared from certain districts. Improved drainage and treatment of the soil had got rid of it to some extent. Heavy showers of rain carried the microbes with it. Some of them were retained in the pores of the soil, but if the soil was porous the microbes were carried away But if there was no free drainage they remained about the surface.

Now as to infection. First of all infection might take place by scratches—inoculation by scratches, but

there were few positive results. When the virulent material was injected into the subcutaneous tissues, or into the muscles, you are more sure of getting black quarter, but not absolutely sure. Then, of course, infection depended to some extent on where the inoculation was performed. If injected into a place like the extremity of the tail there would be a small percentage of positive results. If they used large doses of the poison in this situation they might get more positive results. Experimental evidence taught that it was difficult to infect an animal by way of the alimentary tract. A large amount of virulent material had to be used, and he thought it very probable that it only took place through the medium of wounds on some part of the tract. That, of course, was a subject about which one could not give a definite answer. But it was most likely to be the case as regards the respiratory tract. It was known that if they injected the virus into the trachea—without letting any get into the subcutaneous tissues—the animal did not take black-quarter. It showed a poison fever, but after that it was immune. When injected into the vein they might get black-quarter if they injected large doses, but in most cases they would find the poison fever, and after that the animal was immune. If when the material was circulating in the blood, a bruise was inflicted so as to let the microbes out into the muscles black-quarter was likely to result. That was found after attempting to give animals immunity by injecting virus directly into the vein. It was found that a fewer number took black-quarter, and it was supposed to be due to something which allowed the microbe to pass out. That could be done by inflicting a bruise.

They might ask why did these experimental methods to infect animals sometimes fail? The answer to that had more than an academic interest, because it might explain why one animal took black-quarter while its companion escaped. There were in connection with the disease many things on which they were not sufficiently informed. This paper dealt mainly with the question why these attempts fail. At present he should ask them to confine their attention to trying to discover which of these three paths of entrance was followed under natural conditions. Could they learn that from experiments?

Only two were worth discussing, viz., wounds or scratches, and the alimentary tract. Infection could be produced through the medium of wounds, but the further the virus was away from the oxygen the more likely they were to get positive results. Those wounds that came into contact with the soil might be regarded as the most dangerous. The microbes were not altogether on the surface of the soil, but as pastures became bare or dry earth got scraped away they would find microbes underneath. Tumours seldom developed in the lower region of the limbs where the connective tissue was dense. They might think that those were the commonest places of infection. There was nothing against the supposition that inoculation did take place there, and pass into the blood stream to the tissues at another part. Once in the circulation anything might occur to let the microbes out of the vessels at the shoulder or hip. The fact then that these tumours were not found in the lower regions was not a strong argument that the infection does not often take place through wounds in the lower parts of the limbs.

It was difficult to infect animals experimentally by way of the alimentary tract. In order to perform these experiments successfully larger doses must be used than any animal would take under natural conditions. This alimentary infection might therefore be ruled out. They must admit that it was possible, but he thought they must also admit that most evidence was in favour of wound infection.

All veterinarians who had come into contact with this disease must have puzzled over certain characters of the disease. Why, for instance, did calves and beasts over 2½ years possess a degree of immunity? The immunity was not absolute, certainty, but it existed. Why did the disease disappear for years from a pasture, or why reappear sometimes after a year or two? Thomas, whose experience of this affection entitled him to receive the highest consideration, asserted that he had never seen black-quarter attack adult animals raised in an infected district, although those imported from non-infected districts easily contracted the disease. Arloing, Cornevin, and Thomas, thought that most young animals living in in infected districts became inoculated at one period of their lives with the black leg virus. When the dose was small the animals showed only a passing indisposition which might be overlooked. They were afterwards endowed with a certain degree of immunity. If the dose were large they contracted black leg in a fatal form. Moreover, these authorities suggested that animals living on infected pastures might be subjected to repeated inoculations which further increased the degree of immunity derived from the first infection.

There were serious objections to accepting these observations without reserve. If they were correct one would surely expect to find almost every animal to be immune if it had survived the age of 18 months or less in a black-quarter district. This, of course, was not the case. Anyone who had experimented with the black quarter virus knew how irregularly even susceptible animals acted towards it. Some calves, for instance, would develop the disease after a certain virus had been inoculated while others would resist. Another virus might fail to kill the majority of animals to which it had been inoculated and *vice versa*. Observations of this kind applied to the fresh as well as to the dried virus. They were observed facts, and one usually sought to explain them by suggesting a variation in the number or virulence of the microbes, or by an increased susceptibility of the animal.

He did not think these explanations were altogether satisfactory. There was something wanting. If a number of pathogenic microbes gained an entrance to the tissues of a susceptible animal even in small numbers they multiplied sufficiently to produce the disease, unless they were overcome by the resisting forces of the body, *i.e.*, the phagocytes in particular. It was quite logical to suppose that a few microbes would be more easily overcome than a large number, and that the phagocytes could have more difficulty in destroying virulent forms than weaker ones. Under the natural conditions of infection, however, only a very small number of microbes could gain entrance to the tissues in each case. Moreover, in the majority of cases it was not the rod forms but the spores which penetrate. He doubted if the spores often underwent a material diminution of virulence, for they were extremely resistent to what were generally called adverse influences. They were not destroyed by a dry temperature of 100 degrees centigrade maintained for six hours. He doubted whether the spores were ever materially diminished in virulence. It had been his experience that the virus, even the so-called attenuated virus, never, or but very rarely, failed to give an unprotected animal black-quarter, if the material be mixed with a few drops of acetic acid.

He wished to say that a fresh or dried virus which had not been attenuated might fail to kill unless it be mixed with acetic acid or some other material. Acetic acid and lactate of potash, salt, and other substances were shown by Nocard and Roux to have this assisting action. Arloing had previously demonstrated that ½cc. of a 5 per cent. solution of lactic acid increased the virulence of the black-quarter poison. Nocard and Roux (as could be seen in the Annals of the Pasteur Institute, 1887, p. 257) demonstrated by experiment that these substances had the same predisposing effect even when injected at a part of the body different to that at which the virus had

been introduced. He (Prof. Stockman) had found that a 5 per cent. solution of sodium carbonate had the same effect even when sterilised. The action, therefore, cannot be attributed solely to either the acidifying or the alkalinising effect of the materials injected. He might say, too, that bruising had the same effect. If the tissues were bruised at the seat of the inoculation they were more likely to get a positive result. If they injected a large amount of toxin with the microbes they were likely to get a positive result. It had also a pre-disposing influence. The toxin was got by filtering the muscle juices, or from artificial culture. These materials seem to act by enfeebling the phagocyte properties of the leucocytes. If certain other microbes, harmless in themselves, be mixed with the virus its virulence was increased, and black-quarter surely follows inoculation.

It was known, however, that the black-quarter bacillus was not always present in pure culture in the lesions in animals dead of the disease. There are often other bacteria present as well. The presence or absence of these auxiliary microbes, explained in great part, he thought, the variations in virulence of this or that toxin. When virulent muscle was heated to a temperature between 80 and 90 degrees C. its virulence apparently became attenuated. This temperature killed the auxiliary microbe and the black-quarter rods, but he did not think that it had any material action on the spores of the latter, for the material regained its virulence when acetic acid was added. If other materials be mixed with the heated material its virulence was similarly restored.

In 1897 he performed some experiments on guinea-pigs to test the protective power of the muscle juice from black-quarter lesions, which had been deprived of microbes by filtration through porcelain. He thought it would probably give animals immunity. The results were not very encouraging, and they had not been published. They were interesting, however, as they threw some light on the question now under discussion. In order to test the degree of immunity conferred by the filtered muscle juice a virus of the strength of Arloing's second vaccine heated to 85 or 90 degrees centigrade for 6½ hours was used. Three protected guinea-pigs showed no ill effects after injection of five centigrammes of this material. It did not follow that they would have developed black-quarter, supposing they had not been previously injected with muscle juice. One of the three was inoculated twenty days afterwards with a solution containing 2 mm. of acetic acid and one centigram of dried muscle juice heated to 85 degrees for 6½ hours. This guinea-pig died of blackleg in 15 hours. Six others which he had thought might prove refractory succumbed to black quarter in times varying from 15 to 50 hours after the injection of Arloing's second vaccine mixed with acetic acid. The four protected (?) guinea-pigs—he placed a mark of interrogation or query after protected—resisted Arloing's second vaccine when it was not mixed with acetic acid. He had not tested the effect of mixing the second vaccine with other microbes, but their predisposing action was admitted, and he thought their accidental presence accounted for a good number of the cases in which black-quarter had immediately followed upon preventive inoculation. Moreover it was interesting to note that Hess, in his communication on "Preventive Inoculation" to the Sixth International Veterinary Congress 1895, stated that the number of deaths following the first inoculation (1st vaccine) amounted to about two-thirds of the total number which died of inoculated black-quarter. The first vaccine was prepared by heating the muscle juice to a dry temperature of 100-104 degrees centigrade for 6½ hours. It ought, therefore to be still more attenuated than the second, which was only treated to 85 degrees centigrade. He had already said, however, that he did not think that the actual virulence of the black-quarter spore itself was materially altered. The smaller death rate—one-third of the total—from inoculation of the second vaccine was probably due to the animals having acquired a small degree of immunity after the first operation. The immunity, however, derived from the two operations were by no means absolute, because a certain number of vaccinated animals died of naturally contracted black-quarter. Hess reported the death rate at 5 per cent. among inoculated animals, many naturally contracting black-quarter. The statistics of results of inoculation presented to the IV. International Congress would be found in an article of his (Prof. Stockman's) own, published in *The Journal of Comparative Pathology and Therapeutics*, Sept. 1897, "The Preventive Measures Directed against Black Quarter," etc., and in one by Prof. McFadyean in the same journal. In discussing the question of infection one must not omit the possibility of an animal organism being more susceptible at one time than at another. It was quite conceivable than an animal's leucocytes were not always in good working order, and he did not think it was always the most thriving beast that was struck, as was the saying. It had been seen that there were several substances which exerted a pre-disposing action when introduced from without. Much less was known about the predisposing substance originating inside the body, but their existence was quite conceivable. Seeing that the microbes, or rather the spores, were present in the soil he had sought to discover whether the virulence of infected soils was influenced by the same conditions as the virus taken from the tissues. Two years ago he poured about 300 cc. of washings from a black-quarter muscle of an ox over the dried soil in three flower pots. Owing to other affairs he had not been able until a few weeks ago to test the virulence of the earth. The pots had since remained in a greenhouse exposed to sunlight. Here, then, were the experiments he performed to test this virulence of the soil. All these operations were done with the necessary antiseptic precautions. They were performed on the 15th February. Two guinea-pigs were used. No. 1 received 3 cc. of washings from the soil which was taken four inches from the surface of the pot. The water used for washing the soil had been sterilized. The material was injected into the subcutaneous tissue of the left thigh, and the animal died on the 16th, or after about 20 hours. There was no discolouration of the muscles. An œdematous fluid was present under the skin, but it was clear, black-quarter œdema was red. Cover glass preparations showed many cocci forms but no bacilli. The experiment was a failure, but one must expect failures because the soil was very impure. No. 2 guinea-pig received 3 cc. of the same material to which acetic acid had been added. The animal died on the 16th. The muscle from the thigh up under the belly was much discoloured. It was a red œdema. He made a cover glass preparation, and it contained bacilli which were indistinguishable from those of black-quarter organisms. They were not in pure cultures. That animal, they might conclude, died from black quarter. Next day he took the other two guinea-pigs, which he would call A. and B. A. received 2 cc. of washings from the same soil after it had been heated to 85 Centigrade for 1¼ hours. The result was negative; the guinea pig remained perfectly healthy. Guinea-pig B. received the same material as A., but with a few drops of acetic acid added. The animal died 20 hours afterwards. The muscle was discoloured, and bacilli like those of black quarter were found in the muscle juice. They might conclude that that pig died of black-quarter. On Feb. 26th he performed another series of experiments on three guinea-pigs, which he would label 1A. 2A. and 3A. 1A. received into the shoulder 1½ cc. of the washings from the same treated soil. The animal lived in perfect health apparently. 2A. received into the shoulder 1½ cc. of the same material, but with acetic acid added. This animal died on the 28th after 30 hours with lesions of black

quarter. The bacteria found were indistinguishable from those of black-quarter. The animal had been dead some time before the post-mortem was made, and the lesions were invaded by other microbes in large numbers. It was difficult to prevent this in black-quarter in guinea-pigs as the skin softened soon and allowed the germs to pass. 3A. received into the shoulder 1½ cc. of the same washings and a few drops of a broth which had been sown with ordinary fresh milk and incubated overnight. His object in taking milk was to see if organisms taken haphazard would not answer. This animal died 30 hours afterwards. There was a circumscribed swelling at the seat of inoculation. There was a putrefactive odour and small patches of green discolouration, and extending all along the subcutaneous tissue of the belly was a sanguineous œdema. The abdominal muscles and those of the shoulder were a dark red, as in cases of black-quarter. Cover glass preparations made from the muscles showed bacilli like those of black-quarter. Well to go back to 1A. he experimented seven days after. Into the shoulder he injected 1½ cc. of washings from the same treated soil, plus acetic acid. The animal died 80 hours afterwards. There was a slight sanguineous œdema and discolouration of muscles along the abdomen and shoulder. The lesions were not marked, but bacilli, like those of black-quarter, were present in preparations made from the muscle. Eighty hours was a long interval between the inoculation and the death. Possibly the first inoculation had given some degree of immunity. He merely said it was possible. He did not assert such a thing on the strength of one experiment. He should continue the experiments to see if antiseptics would render the soil innocuous. In a paper read before the Midland Society in 1897, he said he had often advised disinfection of the spot where the animal died. It was not until it laid down and died that the blood began to flow. Disinfection would probably kill the auxiliary microbes. Lime might be tried. He had never tried it, but he should like to hear if anyone had what the results had been. He was going to disinfect the infected soil with carbolic acid, and to take the washings and inject them into the guinea-pig, and see if that produced black quarter or no. If not they might take it that carbolic had done something. If the acid had not killed the spore it might have at least got rid of the other microbes. These experiments which he had described were not very numerous he must admit, but with all necessary reserve on that account he was inclined to believe (1) that the black-quarter microbe was a saprophyte which of itself was feebly pathogenic; (2) that under natural conditions of infection it only became a parasite with the assistance of other microbes, or possibly through other agencies developed inside the animal; and (3) that most of the accidents which followed preventive inoculation were due to an impure virus being used, or the neglect of adequate antiseptic precautions in the performance of the operations. He felt he owed them an apology for putting an unfinished piece of work before them, but he felt justified in doing it because the discussion he hoped would aid him in future experiments. (Applause.)

Discussion.

Mr. Harvey regretted that there was not a larger audience to hear such an excellent paper. The disease was very important to veterinarians, although it was not so prevalent in the West as in some counties in the North. He was glad to hear Professor Stockman's remarks on the part played by the blood in the tissues in developing the disease, but he should also have liked to hear his opinion on the value of setoning. Personally, he thought it was only useful while there was a discharge of pus. The difficulties in regard to preventive inoculation were very great. Scientists did not seem to have yet been able to make it very practicable for country practitioners.

Mr. Dunstan remarked that the Professor, in speaking of the guinea-pigs which had died as a result of inoculation with the washings of infected earth mixed with acetic acid, said that he found afterwards in cover glass preparations bacilli like those of black quarter. Could one be perfectly certain in looking at them through the microscope that they were black-quarter bacilli? Had the Professor, in order to prove their identity, made any cultivations from them? Until recently he had considered the black quarter bacillus fairly easy to recognise, and that in nearly every instance spores were to be found, but the Professor had told him to-day that there was difficulty in distinguishing between it in some of its phases and that of malignant œdema. He noticed that the Professor adhered to the phagocyte theory of immunity, there was another theory which sounded rational enough, viz., that when once an animal suffered from a mild attack of a disease, the bacilli produced in some way a substance which was injurious to the bacillus itself, and that in time this substance or toxin might kill the bacillus, and might furthermore, if the animal recovered from the disease sufficiently, remain in the system and protect the animal from future attack. Setoning was widely performed in his district, he had never seen an animal dead of black quarter with a seton in its breast, but had heard his father say, however, that he had seen it. He (the speaker) was a firm believer in its efficacy, but he must confess he could not explain why, except from experience.

Mr. Bloye said he had had very little experience of black-quarter. But he could join in congratulating the Professor on the experiments which he had conducted. The effect of the addition of acetic acid appealed to him (the speaker) largely as an aid to producing a powerful virus. He had been much struck, too, in regard to the remarks on the mode of infection. That which the Professor claimed as being the chief mode perhaps did not always fall in with the mode of attack or with the number of animals attacked. If the few instance which he (Mr. Bloye) had come across it had been the rule rather than the exception for four or five animals to be attacked simultaneously. He was not going to argue that the ingestion theory was correct, but such a fact did appeal to one as showing that there was some likelihood in the ingestion theory. Four or five animals might eat from the same surface of ground, but it was something to assume that four or five animals should not only have a wound but have it sufficiently bruised to produce the growth of virus in their tissues at the same time. Another point he should like to consult the Professor about was the presence of the auxiliary microbes as a help. Without their old friend setoning no discussion on black-quarter would seem to be complete. Many clients had a great belief in setoning, and often did it for themselves, but after a conversation he had with Prof. Stockman on the subject his belief in its efficacy underwent a very great shock. Since then he had never suggested that he should seton his cows as a preventative.

Mr. Dunstan said there was another theory of immunity which he might have mentioned, namely, that the presence of specific bacilli impoverished the blood of certain substances necessary to their existence, and that a certain amount of time would have to elapse before the blood would have sufficient of the necessary materials in it again for the bacilli to live. Mr. Bloye had spoken about animals being attacked simultaneously. That was not his (the speaker's) experience. He did not remember ever having seen more than two animals dead at one time. After one outbreak two or three weeks might elapse before another was seen.

Mr. Bovett, said he had found many times cases of black-quarter after bruising, and it would point to organisms being in circulation and getting through the tissues. With regard to recovery he had seen one case

which was undoubtedly a case of black-quarter. He had known a cow and heifer die at one time. They had been feeding upon rough hay mown in the fall of the year. Whether that had any effect he could not say, but there was an impression in his district that if they got rough grass, or put stock into it, orchard grass especially, they would find that black quarter would follow. He remembered a case of an animal being attacked on the Saturday and living till following Sunday week. This animal had not been setoned. There had not been any case on this farm for seven years, and then there were three or four cases in succession. But he had never seen several cases simultaneously on one farm. Generally when one case of black-quarter occurred others quickly followed in the same district.

Mr. DUNSTAN: Can Prof. Stockman give any reason why animals should be more liable to attack from black-quarter just when they are in an improving condition?

Prof. STOCKMAN: Farmers generally say so; but it is not my experience.

The PRESIDENT said he was reared in a neighbourhood where the disease was rife, and he still resided in a district where it was common. The disease caused the greatest loss among stock. The loss which it caused was twenty times as great as that due to any disease now in the scheduled list under the Contagious Diseases Act. He wished Prof. Stockman had been able to go a little further, and had been able to suggest some means whereby the microbes could have been destroyed, and the farmers' losses thereby lessened. As to the theory of infection from the soil, he would remind the Professor that a large number of outbreaks took place among young animals found in houses where they did not come into contact with the soil. He granted that the disease was more rife about the month of October when a heavy rain was going on, than at any other period of the year; but still deaths were constant in houses where animals were not allowed to roam about at all. Might not the microbe exist in the food as well as in the soil? Professor Stockman had clearly proved that the microbe would stand a great deal of heat, and he (the speaker) took it that it would stand any amount of drought; that the spores would live in a perfectly dry condition and for a considerable time. Had the Professor examined any worm casts? There was a great likelihood of spores being cast up in that way. It was in a wet and rainy season that the disease was more prevalent than during the height of the summer when the soil was hard and dry. It was only during humid weather that the earth worms worked freely. He quite agreed that washing of the soil would wash in the spores and germs. The Professor asked if any of them had known a piece of land drained and limed cured of black-quarter. He knew a large farm where nine or ten per cent. of the animals used to die. The place having been well drained and limed had been cured for several years. The disease had never been so prevalent since, although the drainage was done 18 years ago. He was glad to hear the Professor say that the disease was rarely contagious. He (the speaker) could back that up by saying that the outbreaks were curiously isolated. As a rule they found only one death in a herd, and that at long intervals. As to the infection theory that it was necessary to have a wound for the germs to get into the system, he had never been able to follow that exactly. He did not think it was always necessary for an animal to have a wound for the microbes to get through. There must be some absorbing power in the animal's system through which they got if they came into contact with certain surfaces. He had known of animals dying in which there was no scratch or wound of any kind detected. There was a widespread idea among farmers that bruises would lead to attacks of black-quarter, and where there was a prevailing idea over a large district there was usually some truth in it. That was one reason why he held to setoning. Farmers thought it afforded some protection, although it was difficult to explain. One member had suggested that setoning might be a protection by increasing the number of leucocytes in the system. But they really could not say what was in the animal's system to make it immune. He should like to ask whether there had been any great number of protective inoculations in cattle in this country. It seemed curious that an acid and an alkali should intensify the poison of a germ.

Professor STOCKMAN, in replying to the discussion, said he had made a great many observations on setoning, and he confessed that he did not believe in it. He did not, however, say that was a reason why it should not be done. If their client insisted on its being done because he believed in it, they might do it without any breach of professional honour. But he would not do it unless he was particularly asked to. He had seen animals die with setons in their brisket. A professional friend had sent him the results of experiments in setoning. Sixteen animals were placed on a badly infected pasture. Fifteen of them were setoned the sixteenth was not because he was seedy. Everyone of the setoned animals died; the other one was the only one left of the lot. He tried next the influence of setoning on the white blood corpuscles. He counted the white blood corpuscles in the setoned animals and he found there were no greater number in those that were not setoned. He thought that pus germs might give a certain degree of immunity. He believed now that they had an opposite effect. When he started these setoning experiments he thought they might give a degree of immunity, but he not only inoculated the animals with pus germs but with the products of pus germs, and he counted the leucocytes while these germs were under the skin, and while the toxins were circulating in the blood, and he found in both cases, more particularly in the case of the toxins, the leucocytes were limited in number. When he examined the setoned animals, which had the same dose and the same poison he found that the septic setoned died in the short space of 24 hours, preceding the one that was not touched by 12 hours. That might be a coincidence, but seeing that one so often found animals dead of black-quarter with setons in their tissues, he thought they must conclude that there was very little in setoning. There was very little help in confusing *post hoc* with *propter hoc*. They found a cow had black quarter. They setoned her and the disease disappeared. But they were not justified in saying that setoning had done it. In many cases when an animal died from black-quarter another case did not occur for a week or more. As to protective inoculation he did not think, unless they were in a district where the disease was causing great loss, they would be justified in advising a client to go in for it. He thought they could save a great number through it, but unless the disease was raging severely he would not advise them to have anything to do with it. He knew Professor MacFadyean had been sending out a good deal of vaccine, and he had told him the results had been satisfactory, but he (Professor Stockman) did not know how many people he had sent them to. The bacillus of malignant œdema and the bacillus of black-quarter were very much alike. They could distinguish them in one form, but in the form *sporated* he did not think they could be distinguished. But it was possible to distinguish whether an animal had died from malignant œdema. They would find long threads which they would not find in black quarter. Cultures he did not make because they did not help. Microbes behaved exactly the same in culture. What he relied on was the absence of long threads from the peritoneal fluid. In regard to the parasites, there were certain substances in the blood which gave the animal immunity, but all the evidence went to show that these substances came mainly through the leucocytes. The anti-toxin stimulated the leucocytes to manufacture these so-called protective substances. As to acetic acid

he thought there was no doubt that it acted by enfeebling the leucocytes.

Mr. DUNSTAN: Would an alkali have the opposite effect?

Prof. STOCKMAN: No, it has the same effect. When farmers said that they often got black quarter after bruising it simply meant that they had a black-quarter district, and there was the kind of wound more quickly infected by black-quarter. He had seen one or two dead sometimes; not often. He did not scout the idea altogether of alimentary infection, but it was difficult to reconcile infection that way with strong experimental evidence. As regards the specific microbe that was a very pertinent question. But this meant an awful piece of work. There were thousands of microbes present in the soil, and they would have to be separated. Recovery, as was well known, seldom occurred. Of course it was quite possible that a wound in the mouth might be the port of entrance for the spore, and that it travelled to the fore quarters was also possible, but the difficulty of infecting by the alimentary tract was great. If black quarter juice was thrown over the throat they would not generally get black-quarter. That would not happen with anthrax. Perhaps, after all, the majority of evidence was in favour of constant infection through wounds. The floor of a cowshed whether soil or not might get infected. Among those who believed in the alimentary infection of black quarter the idea was that the hay or grass from a black quarter pasture was capable of carrying the disease. The animal might be infected by a wound in the mouth, but if that did happen he did not think it purely alimentary infection. In a black quarter district if they took any part of the soil and mixed with acetic acid they might get a positive result. He knew in many cases the pastures were pretty bare when black-quarter came on and he had always explained it by the fact that the animals came more in contact with the soil itself instead of having a great deal of grass as it were between them. The bacilli would exist for ever in the soil unless they drained it. He suggested that it was possible to get rid of it by lime, but there was a far better chance by draining. He did not think that if animals were got rid of we should ever be rid of the bacilli. Why they raged in one district more than in another could be explained on the theory that in the affected district there were more helping microbes. He was not inclined to put it down to predisposition in the cattle. In black-quarter districts cattle instead of becoming more pre-disposed really became more immune.

On the motion of Mr. Bloye, seconded by Mr. Harvey, Professor Stockman was heartily thanked, and he briefly acknowledged the compliment.

The members subsequently dined together.

EXTRACTS AND NOTES.

RABIES.

(Abstract of Lectures delivered by Professor ROSE BRADFORD, M.D., D.Sc., F.R.C.P. Lond., F.R.S., Professor Superintendent of the Brown Institution.)

Gentlemen,—I propose to deal in this second lecture with the question of diagnosis of rabies in man and animals.

The diagnosis of rabies may be considered from three points of view—the clinical, the post-mortem, and the experimental. It is, of course, most desirable to make the diagnosis clinically. This, however, is frequently difficult and sometimes impossible, and in the case of animals it is probable that the diagnosis is most often arrived at from a consideration of the post-mortem lesions. These, however, are frequently not very characteristic and hence there may not only be difficulty in the diagnosis of the disease during life, but this difficulty may not be removed on post-mortem examination. The experimental method of diagnosis by inoculation affords a more certain means of arriving at an accurate conclusion than either the clinical or the post-mortem diagnosis. It is, however, not infallible and in some cases, as I shall show later, it may be impossible to make an accurate diagnosis even by the experimental method. We will consider first of all the diagnosis of the disease clinically—that is to say, the diagnosis from the study of the symptoms. It will be necessary to consider the symptoms of rabies only in man, in the dog, and in the rabbit. As mentioned in my first lecture the occurrence of the malady among other animals is rare.

Rabies exists in two forms—furious rabies and dumb or paralytic rabies—and in these two forms it affects man, the carnivora, and rabbits, but in man and the carnivora the furious form is by far the more common as an initial manifestation, and in rabbits the great majority of cases exist in the dumb form. Dumb or paralytic rabies does, however, occur in man and the dog under two circumstances—firstly, as a terminal phenomenon in the great majority of cases of furious rabies, and, secondly, as the sole manifestation of the disease. In the rabbit furious rabies is occasionally seen but it is rare, since during the last four years out of 414 cases of rabies in rabbits observed at the Brown Institution there were only some three cases of furious rabies, and it is a point of some interest that furious rabies can be transmitted by inoculation from one rabbit to another.

SYMPTOMS OF RABIES IN MAN.

I will deal first of all with the symptoms of rabies as presented in man. Three stages in its evolution in man may be recognised: (1) a prodromal period; (2) a period where the disease is fully established; and (3) the third or paralytic stage. In some cases the third stage may be absent, in others the prodromal symptoms may be absent, and, as I have mentioned before, in a few instances the disease exists in the human subject in the paralytic form. That is to say, the first and second stages may be absent.

1. *The prodromal period.*—We will consider first the prodromal symptoms, although these are often vague and, as is frequently the case in other diseases, are recognised as such only after the malady has declared itself. The most important of these symptoms are a general malaise and an alteration in the mental state of the individual leading him to become melancholy and tending to make him shun the society of his fellow-creatures. The patient also suffers from sleeplessness and when asleep his rest is disturbed by nightmares, and it is said that often the nightmare reproduces the scenes of the dog biting him. It is stated—and it is a point of some interest—that even in cases where persons have been bitten by dogs which were not known to be rabid, although they really were rabid, that during the prodromal period following the bite the patient suffers from a peculiar apprehension and vague dread. In the bulk of cases this apprehension or dread is readily explained owing to the fact that the sufferer generally knows or suspects that the dog or other animal was suffering from rabies, but it is definitely stated by various authorities on the malady that the same dread or apprehension may exist where this fact is quite unknown. Other prodromal symptoms are a certain amount of præcordial distress and also slight dyspnœa. The mental symptoms, such as melancholy and apprehension, may in some cases reach such a high degree of development as to amount to insanity, and it is a point of some interest that the virus of rabies may cause symptoms closely resembling

those of insanity. The prodromal period is said to last from 10 to 15 days.

2. *The period when the disease is fully established.*—The second stage of the malady is generally ushered in suddenly with dyspnœa and, as I mentioned before, it may occur without any preceding prodromal symptoms. The dypnœa is severe and very soon the characteristic spasm on attempt to swallow is seen. The patient on attempting to swallow is seized at first with a spasmodic convulsion which involves simply the muscles of the pharynx causing expulsion of the liquid or the substance through the mouth. Very soon however, the spasm on the attempt to drink spreads to other musclar structures, and not only are the muscles of the pharynx involved but those also of the head and neck ultimately, those of the trunk and even of the limbs, so that an attempt to drink is followed by a more or less generalised convulsion. The convulsive seizures are, however, not limited to the swallowing movements, but the respiration becomes jerky, being interrupted by irregular contractions of the diaphragm producing a sudden and well-known gasp. It is this jerking respiration which has given rise to the popular idea that the sufferer barks. At this time the special senses become more acute, especially hearing and cutaneous sensations, and the period very soon arrives at which the convulsions of the disease are not only produced by attempts to swallow, but at the mere sight of objects or the hearing of sudden noises, or even a draught of air touching the bed-clothes or skin. During the whole of this period the apprehension that existed during the prodromal stage becomes further increased and the patient dreads—and his dread is seen in his face—all the things which will lead to the production of a spasm, such as a sight of fluid or the approach of bystanders to his bedside. It is not at all uncommon at this stage of the malady for a condition of furious excitement, or even one of actual mania, to develop. The frequency of the pulse is greatly increased. Fever is present and the temperature may even reach as high a point as 104° F. Glycosuria and albuminuria are often present. Death may occur from asphyxia during one of the convulsive seizures, but often the malady passes into the third or paralytic stage, which is characterised by a rapidly progressive weakness, involving the bulbar muscles, then spreading to the larger muscles such as those of the limbs, and finally to the trunk muscles, and so causing death from cessation of respiration.

3. *The paralytic period.*—The duration of the disease is usually from three to four days from its onset and some two to three days after the first convulsion. In some cases, as I have already mentioned, the first and second stages of the malady are absent and the disease exists in the human being in the third or paralytic form. Under these circumstances, with or without prodromal symptoms, a rapidly increasing paralysis, involving first the extremities, then the trunk, and finally the respiratory muscles, occurs, and, as I mentioned in my first lecture, this paralytic form of the disease was recognised by Van Swieten,[2] and in 1753 Hoin described four cases of paralytic rabies occurring in man amongst eight individuals who were bitten by a rabid wolf.

Symptoms of Rabies in the Dog.

The early symptoms of furious rabies in the dog are, first and foremost, an alteration in the habits of the animal so that it tends to become restless, miserable, and sad, and it is noticeable that at this early period of the disease the animal is in no way savage. Soon afterwards it seeks solitude by hiding under chairs or in dark corners and very soon it suffers from attacks of excitement followed by drowsiness. It is rather characteristic of the malady that the animal wakes up suddenly without apparently realising its position and surroundings. Very soon the reflex activity of the nervous centres becomes increased, so that sounds and sights which before passed unnoticed now produce excitement, and at this period of the malady the animal may bite strangers, although it is not usual for it to attack or bite those to whom it is accustomed. The appetite still remains good, but fever is present. In the third stage the restlessness becomes much more marked, the animal cannot keep still, and it attacks furiously surrounding objects and destroys them, biting the furniture and the carpets—in fact, anything with which it comes into contact. It is evident that at this time hallucinations are present, as it is not uncommon for a rabid animal to spring at imaginary objects in the air. The voice becomes affected, owing apparently to the commencing paresis of the larynx, so that the characteristic bark is heard, the main distinguishing feature of which is its peculiar long-drawn stridulous character dying away in a howl. During the earlier period of the malady the seat of the bite is hyperæsthetic, but now it becomes anæsthetic, and later the animal may not only in its excitement bite surrounding objects but it may even bite itself, and more especially, it is said, the region where it was itself bitten. At this stage, when the malady is fully established, there is considerable excitation of the genital organs and this is a symptom that is often marked in man. It is also characteristic of the malady at this period for the animal to wander away. The mad dog will often travel very long distances, and it is in this way that the disease is spread to other animals and to the human subject, as very frequently the strange dog is approached by other dogs who thus get bitten. The excitement becomes more and more marked and the animal more and more furious, and it is at this period of the disease that foreign bodies of all kinds are swallowed, such as wood, coal, hair, and straw. Soon the excitement diminishes and the animal becomes paralysed, the palsy very often commencing in the jaw muscles, and it rapidly spreads to those of the limbs, finally affecting the respiratory muscles and so causing death. The palsy may be hemiplegic or even monoplegic in its distribution, but, as just mentioned, it spreads rapidly. The duration of the disease in the dog is from two to ten days, but from four to five days is the more usual period. The most characteristic clinical features in the disease apart from the difficulty in swallowing—which is well established when the furious excitement is present—are the bark and the restlessness. In cases of doubt in the diagnosis of the disease the rapid onset of palsy after the excitement is perhaps the most characteristic feature.

In the dumb form of the disease sensory troubles are not so marked, and, as a rule, the prodromal symptoms are not very obvious, but careful observation will usually show that there has been some change in the habits and that the animal has become anxious. The palsy usually begins in the jaw, causing the well-known drooping of the lower jaw with the viscid saliva hanging from it, but the palsy may begin in other parts of the body and may be either monoplegic or hemiplegic in its distribution. The average duration of paralytic or dumb rabies is from two to three days and the symptoms in no way differ from the terminal symptoms in the last or paralytic stage of furious rabies. Glycosuria is found in a considerable number of cases of rabies in the dog and sometimes albuminuria.

Symptoms of Rabies in the Rabbit.

In the rabbit the most characteristic features of rabies are somnolence with gradually increasing weakness of the hind limbs which rapidly spreads to the body generally, while the general health remains good. Fever and polyuria are also present, and very soon twitching and convulsive attacks occur in which the spasms are generally of a clonic character, together with grinding of the

[2] *The Lancet*, March 3rd, 1900, p. 593.

teeth. The weakness of the hind legs is often so marked as to cause complete paralysis, and the rabbit will drag itself from place to place slowly by the action of its fore-legs. Wasting, although present in the terminal stages of the disease, is not very marked before the onset of the palsy. It is very characteristic of paralytic rabies in the rabbit that the palsy, especially of the hinder extremities, becomes extremely well marked at a time when the general health of the animal has not undergone very great deterioration. It is common to see rabbits with complete paralysis of the hinder half of the body eating greedily. The presence of the clonic spasms and the twitchings of the trunk muscles at a time when the hinder extremities are paralysed is also very characteristic of the disease. There are many pathological conditions in which palsy of the hinder extremities occurs in the rabbit, so that this by itself is by no means characteristic of rabies. The characteristic features is that the posterior palsy rapidly spreads to all the muscles of the body and occurs at a time when the general health is good, as shown by the nutrition of the animal and by its taking food. Furious rabies occurs occasionally in the rabbit and then the symptoms are not very different from those seen in the dog. It is a point of some interest that the furious form of the disease when it occurs in rabbits may apparently be transmitted from one series of rabbits to another by consecutive inoculations through a considerable number.

In man the diseases which have to be distinguished from the furious form of rabies are tetanus, mania, delirium tremens, and cases to which the term "lyssophobia" has been applied, where after having been bitten spurious symptoms of rabies become developed. The resemblance between tetanus and hydrophobia is really very distant, the spasms in the one disease being far more generalised and continuous and in the other more localised to the throat, at any rate in the early stages, and intermittent. The confusion, of course, is apt to arise between the two maladies owing to the fact that tetanus may follow a bite in the same way as it may be the sequel of any other wound. Apart from the difference in the distribution and character of the spasms one of the most important ways of distinguishing between the two diseases is by a consideration of the incubation period, that of tetanus being very much shorter than that of rabies. Cases of mania and delirium tremens sometimes present difficulty, especially where these maladies have supervened in patients after they have been bitten. One case has come under my observation where a woman bitten by a dog which was reputed to be mad suffered from symptoms of delirium tremens which were ultimately fatal and which were thought to be those of rabies. Experimental inoculation made from the medulla of the patient and from the medulla of the suspected dog showed the absence of rabies. It is not very uncommon for lyssophobia to be confounded with rabies, and in the *Annales de l'Institut Pasteur* [3] there is a very good description of a case of lyssophobia where the diagnosis was arrived at partly from a consideration of the incubation period, which was only seven days, and partly by the difference of the symptoms. In this case the patient had no difficulty in keeping water in his mouth and the spasm only developed when he attempted to swallow; and, in the second place, a draught of air only produced a spasm when it was directed against the mouth or nose, whereas in the genuine disease, as I have just mentioned, the slightest cutaneous irritation produced by the incidence of cold air is quite sufficient to cause a spasm. The case I have just alluded to as recorded in the *Annales de l'Institut Pasteur* recovered with simple treatment. The fact that symptoms mimicking those of genuine rabies may occur after the bites of animals in susceptible people is a point of considerable practical importance as regards the reported cures of hydrophobia by bath treatment.

In the case of paralytic rabies in man the diagnosis is much more difficult, as there are several affections of the spinal cord which may give rise to an acute ascending palsy and probably in the majority of cases a satisfactory diagnosis could not really be made without experimental inoculation.

The differential diagnosis of rabies in the dog is often difficult. First of all, in the furious form there are many diseases which may be confounded with rabies, more especially epilepsy and also the epileptiform seizures that are seen in dogs to accompany disease of the external and middle ear. In both these conditions an animal previously quiet and well-behaved will be seized with a fit which may be followed, just as epileptic fits in man are, by a very considerable degree of excitement. Such cases as this perhaps afford the greatest number of the cases of suspected rabies. There are several organic diseases of the brain, more especially the presence of cysticercus in the brain, which will cause epileptiform seizures which may be mistaken for rabies. It would not be thought that such a malady as rheumatism would be confounded with rabies in the dog, but the mistake has arisen owing to the painful and swollen joint having been roughly examined and the dog, irritated by the pain, has bitten a person—and very often the mere fact of a dog biting the individual is held to be sufficient presumptive evidence of the existence of rabies. Intestinal obstruction has also been confounded with rabies in the dog, both clinically and on post-mortem examination

As regards dumb rabies the greatest difficulty in making the different diagnoses arises in cases of impaction of a foreign body in the throat. Both in dumb rabies and in this condition swallowing is impossible. Very often a history pointing to the swallowing of a foreign body can be obtained and it can be noticed that there is not, strictly speaking, true palsy of the jaw, and, further, the prodromal symptoms have not been present. At the same time, it is very unwise to examine carelessly the mouths of dogs suspected of suffering from impaction of a foreign body, for if the case be one of rabies it is possible that the disease might be communicated by rough or careless manipulation. Inflammation of the temporo-maxillary articulation in the dog producing immobility of the lower jaw has also not infrequently been confounded with rabies. In all the diseases in dogs which are liable to be confounded with rabies the isolation of the animal will speedily settle the question, inasmuch as the duration of both furious and dumb rabies is very definite and also the mode of spreading of the malady. This is especially true of dumb rabies.

Diagnosis of Rabies by Post-Mortem Examination.

There are two principal reasons why rabies cannot be excluded by a post-mortem examination in animals. First of all because the animal is often killed in the early stages of the disease, before the lesions have had time to develop, and, secondly, because rabies may co-exist with other lesions, as, for instance, with the perforation of the stomach or intestines that may be produced by the ingestion of a foreign body. These are both very serious fallacies and they perfectly justify the statement that the disease can never be excluded by post-mortem examination. At the best the post-mortem signs are not very characteristic. In the dog the mouth and tongue are generally coated with dirty thick mucus and the mucous membrane is dry and red, and erosions, or even extensive ulcers, are not uncommon in the mucous membrane of the mouth. The salivary glands, and especially the submaxillary, are intensely congested and there is well-marked infiltration of the connective tissue of these glands. As regards the stomach there are three points to

[3] Annales de l'Institut Pasteur, January, 1900.

notice. In the first place the organ contains no food ; in the second place it may contain a very large number of foreign bodies of the most diverse description, such as wood, coal, bone, fæces, hair, and the like ; and, thirdly, ecchymoses of varying size are commonly present. The intestines are empty and retracted, and signs of commencing nephritis are usually present. The urine contains albumin and sugar in some 50 per cent. of the cases. The other lesions that are found, such as petechial hæmorrhages in the pleura and under the pericardium, are to be looked upon rather as lesions produced by the asphyxia, which is the common mode of death, than as intrinsic lesions dependent on rabies. The greatest stress is usually laid by veterinarians on the results of the examination of the stomach in cases of suspected rabies, but the mere presence of foreign bodies and even of fæces in the stomach is most untrustworthy evidence of the disease. No conclusion should be drawn as to the probable presence of rabies unless together with the presence of foreign bodies in the stomach there is absence of food and unless ecchymoses are present.

In man post-mortem signs are also not very marked and very often a number of those actually found are dependent on the modes of death, as, for instances, the acute emphysema that has been described, which is probably dependent on the dyspnœa, and the death from asphyxia. In the nervous system the blood-vessels are found to be injected, petechial hæmorrhages are not uncommon, and patches of softening have been described in the cord and medulla ; the nerves are also hyperæmic, the salivary glands are congested, and petechial hæmorrhages are also found in the mucous membrane of the stomach. Slight nephritis has been already described. In the rabbit the most important post-mortem signs are the congestion and ecchymoses of the mucous membrane of the stomach and intestine.

The Experimental Method of Diagnosis of Rabies.

A fragment of medulla or some other part of the central nervous system should be taken from the suspected case and placed in pure glycerine. After being in this from two to three days the fragment of the medulla should be pounded in a sterilised mortar with some sterilised salt solution or bouillon, and an emulsion of it so made should be filtered through sterile muslin and a small quantity of it introduced into a syringe sterilised by boiling. The inoculations should be made either into the anterior chamber of the eye or subdurally, the latter is preferable owing to the fact I mentioned in my first lecture that by this means there is a greater certainty of communicating the disease. Inoculation into the eye or intravenously, or even subcutaneously, may be successful, but there is not the same certainty as there is in the subdural method. The aqueous humour was recommended more especially in cases where the material was suspected of being contaminated with other organisms with the idea that if the eyeball suppurated it could be removed, and at the same time the virus of rabies would have had the opportunity of infecting the nervous system through the optic nerve. So that at one time it was not uncommon to inoculate into the aqueous humour if the suspected material arrived in a putrid state. This procedure, however, is unnecessary, as in many cases brains have arrived at the Brown Institution in the hot weather more or less decomposed, and the inoculation of this decomposed cerebral material subdurally has not been followed by any septic complications. So that in all my observations the subdural method of inoculation was used. If rabies be present the symptoms usually declare themselves from 12 to 19 days after the inoculation, but it is important to remember that they may be delayed for as long as 40 days and that therefore even after inoculation one cannot exclude rabies until a period of something like six weeks has elapsed. This, however, is unusual. There is no difficulty in the diagnosis of experimental rabies if attention be paid to the point that the palsy in the rabbit is accompanied by clonic spasms, and the only difficulties that present themselves in the diagnosis of rabies experimentally lie in the fact that sometimes the brain injected is contaminated with other organisms, such as those of septicæmia, and so the inoculated animals die within two or three days of the inoculation, or else, as in the case quoted in my first lecture, advanced decomposition in the material injected prevents the manifestation of the activity of the virus of rabies.

I will conclude my lectures with drawing attention to the incidence of rabies in this country during the last few years. In the year 1892 there were 38 cases of suspected rabies reported to the Board of Agriculture. In 1893 there were 93, in 1894 248, in 1895 672, in 1896 438, in 1897 151, and in 1898 17, so that in the years 1894, 1895, and 1896 there was a very severe outbreak of rabies in the country. In 1895 there were 45 suspected cases in London, in 1896 128, in 1897 19, and in 1898 one. At the Brown Institution I investigated in 1896 168 cases of suspected rabies and proved the existence of the disease in 113 cases. In 1897 there were 64 suspected cases and 25 real cases ; in 1898 there were 17 suspected cases ; and in 1899 there were 10 suspected cases, but none of them proved to be cases of rabies. It was, therefore, proved that out of a total of 259 cases of suspected rabies examined in the last four years rabies existed in 138, that is to say, in 53 per cent. of the cases. The experimental method is of the greatest value in providing accurate statistics of the incidence of the disease, but, as I mentioned in my last lecture, it is not so useful for the purpose of determining whether an individual bitten by an animal suspected of rabies should or should not undergo the Pasteur treatment owing to the fact that so long a period—at least from 12 to 19 days—must elapse before a conclusive answer can be given, and because in some cases the incubation period in the rabbit may be prolonged to a length equal to that of the usual incubation period in man—namely, six weeks.—*The Lancet.*

Withdrawal of the Foot-and-Mouth Regulations

On Friday, March 23rd, in the House of Commons questions on this subject were put to the President of the Board of Agriculture by Sir H. Bullard, relating to Tombland Fair ; by Sir Samuel Hoare, asking for the repeal of the regulations ; Mr. Soames, for the repeal in distant places ; and Mr. Field on foot-and-mouth disease in America and the risk of importation into this country. Mr. Long stated, in the course of his reply, that no further outbreak of foot-and-mouth disease had been reported from Norfolk since February. He had reason to believe that the disease was stamped out, and he proposed to withdraw the restrictions as from Monday next, which would enable the markets and fairs to be held. The attention of the Board had been directed to the report of foot-and-mouth disease in South America. Full investigation and inquiry would be made ; meanwhile, special precautions were being taken at the ports to minimise possible danger.—*The Field.*

A Tuberculous Goat.

The goat is usually regarded as all but immune to tuberculosis, but one of these animals has been condemned in the Carlisle district during the past year. The goat in question had been for a considerable time the constant companion of a very tuberculous cow, and upon testing with tuberculin by Mr. Robinson, M.R.C.V.S., reacted markedly to the test, and again eight weeks subsequently. The carcase was found to be affected with generalised tuberculosis.—*Sanitary Record.*

THE ILLEGAL APPOINTMENT.

Lieutenant-Colonel Brookfield's staff for the 14th Battalion Imperial Yeomanry has now been completed and is under orders to sail in the Goth from Southampton on the 31st instant. Its composition is as follows :—Commanding officer, Lieutenant-Colonel Brookfield, M.P., commanding 1st C.P.R.V. * * * veterinary surgeon, Vety-Lieut. Spanton, Duke of York's Own Montreal Hussars.—*Kentish Express.*

A correspondent adds the following information :—J. P. Spanton, son of the late John Spanton, Barfrestone, Dover, farmer, age 25 or 26, was apprenticed to a butcher at Hythe and served his time. Went to Canada and worked for someone who used or sold horses, came home with several cargoes of horses for him, and, finally, with a few for himself ; in the meantime attending lectures at McGill's College, Montreal, of which he is said to be a licentiate. Started in practice near Dover, Kent.

Surely it would be only fair to *state in the local papers in which he has* made *such a flourish*, that he is not on the Register of the College ; this to be done by Council of R.C.V.S.

How could he get this appointment ? was it through the Canadian horse dealer ? and was there no examination ?

ARMY VETERINARY DEPARTMENT.

From *The London Gazette.*

War Office, Pall Mall, Mar. 23.

Imperial Yeomanry. Remount Depôt.—W. McKie, M.R.C.V.S., to be Veterinary Officer, with the temporary rank of Vet.-Lieutenant.

March 27.

Imperial Yeomanry.—D. C. Barningham, gent., M.R.C.V.S., to be Veterinary Officer, with the temporary rank of Vet.-Lieutenant.

Lieutenant Ayres who went out with the 39th (Berkshire) Company, which forms part of the 10th Batt. commanded by Lord Chesham, recently sent the following telegram to his brother, Mr. Frederick Ayres, of Reading—"Kimberley, Mar. 21, 5.5 p.m. Off to Mafeking, very fit."—*The Times.*

Vet.-Captain Newsom is seriously ill with enteric.
Vet.-Lieut. Pye, (enteric), is progressing favourably.
Ladysmith, March 22.

Veterinary Deficiencies.

Bloemfontein, March 23, 5.5 p.m.

The sick horses which have been placed on grazing farms in the neighbourhood of Bloemfontein are making surprisingly rapid progress towards recovery.

The losses among the horses hitherto, owing to the cheeseparing policy adopted by the War Office towards the Veterinary Department, must reach a considerable figure.

The surgeons are everywhere overworked, and absolutely incapable of attending more than a small proportion of the cases of sickness.

The result is that numbers of horses have been discarded and left to perish, though a few days' treatment might have cured them.

The introduction of civil assistance into the Military Department at a moment of pressure is not a commendable method to pursue.

Time is necessarily occupied in learning the details of the routine, and friction is unavoidable.

It is to be hoped that in any new scheme brought forward by the War Office provision will be made for placing the Veterinary Department on a more ample and secure footing.—*Morning Post.*

CORRESPONDENCE.

FINANCIAL POSITION OF THE R.C.V.S.

Sir,

In your issue of 17th inst. you report a speech of Mr. Trigger in which he states his desire to be returned to Council "because the financial condition of the College (R.C.V.S.) was so *bad* that he would like to see it remedied before he ceased to be officially connected with it."

Mr. Trigger is also accredited with having stated that the funds of the College amounted to £7000 invested in consols. "Their income from that source was therefore only about £200, whereas the working expenses of the College were something like £1300. They were dependent for the difference entirely upon the profits of their examinations, which, *since the introduction of the four-years'-course*, had shewn a very great diminution. It came to this that unless they could endow the College in some way, the whole question of examinations would have to be revised, etc."

Personally, I thank Mr. Trigger for so candidly admitting that the financial ruin brought on the College dates from the inauguration of the four-years'-course and the stiff matriculation examination in all subjects at one sitting ; but as these so-called reforms were forced upon the teaching colleges by those members of the Council who voted in the majority, they alone are to blame and not the members of the profession. Neither are the Principals of the Scottish Colleges to blame, for they prognosticated financial failure to the teaching colleges first, and in time a like result to the licensing Institution. To remedy the financial failure, which Mr. Trigger and the majority of the Council have brought on their pet Institution, Mr. Trigger now suggests the raising of money by subscription so as to increase the income of the R.C.V.S. and thus enable it to continue to pay the examiners' fees, and its other pecuniary obligations.

If Mr. Trigger had proposed the raising of funds to endow the teaching and licensing colleges alike, so as to enable them all to weather the storm until the increase of the number of students matriculating and the fees thereby obtained were sufficient to meet all pecuniary demands, I could have appreciated his generous offer of personally subscribing £100 ; but to ask the members of the profession for subscriptions to enable him and other members of the Council to carry on their war of extermination of the teaching colleges in Scotland, is an outrage against all the principles of equity and justice, and I hope the members of the profession will shew their sense of fair play by refusing to subscribe one shilling to any such scheme.

The Council of the R.C.V.S. like the governors and principals of the teaching colleges, must be allowed to live on their own unaided capital until they realise clearly that there is but one way of conducting and maintaing the permanency and usefulness of all *unendowed institutions*, and that is when their income is at least sufficient to meet their outlay. Let the Council of the R.C.V S. and the governors and principals of the teaching colleges lay their heads together to do all in their *united but unaided power* to advance the interests of the profession, consistent with all the institutions "paying their way," and there will be no necessity for asking

or receiving pecuniary help from any member of the profession. If the colleges are to teach students at less than the expenses incurred, then it is for the *State to contribute that sum*, and neither the governors, principals, or members of the profession.

We cannot bring our mind to annul or discontinue the four years' course, but we are decidedly of opinion that the matriculation examination should be allowed to be passed in section (as in the medical) and not, as at present, compulsory in all subjects at one sitting. We are also of opinion that the professional examinations should be conducted on the same lines as the medical, viz., a pass in any one subject to count as a pass, and a failure in any one subject as failure in it only. The rule at present is—a failure in any one subject a failure in all.

A great deal has been attempted to be made out by certain parties as to following the lead of the medical profession, but as I have just shown, these same parties only follow the lead when they perceive that by doing so they close the door the more effectually against the admission of students to the colleges.

At the present moment we hear a great deal about members of the medical profession doing their best to belittle us, and obtain appointments which belong of right to the members of the veterinary profession, and by our cringing and following of their lead it is very questionable but that we have brought a great deal of this ignominy upon our own heads.

The profession as a profession owes very little thanks to anybody for mercies received. The State has done nothing for us. The medical profession, now that we are coming into prominence, "would like to pull our chestnuts out of the fire." My advice therefore is have an educational body of our own and follow our own lead, and if the present members of the Council cannot see their way to do this and bring back prosperity to the Institutions directly and indirectly entrusted to their care, then the sooner they resign the better for all interested, as matters cannot be allowed to remain as at present.—I am, your obedient servant,

JAMES MCCALL,
Principal of the Glasgow Veterinary College.

SKIN DISEASE.

Sir,

Re case mentioned by Mr. Wallis Hoare, in *Veterinary Record* of 24th inst., I remember meeting with one such case, in a horse belonging to a marine store dealer, in which nearly the whole of the hair came off the body, leaving the skin shiny. There was no irritation.

On making enquiries as to history of case found that the animal had been fed almost exclusively on stale bread. A change of diet was ordered and some wash given to dress the skin, with tonic medicine to support the system. No further treatment was needed.—Yours truly,

W. AWDE.

FARRIER-SERGEANT OR VETERINARY OFFICER.

Sir,

In your current issue, under the above heading, a letter is published in reply to an article in the previous week defending the action of the authorities in appointing a non-qualified man as veterinary officer of the 12th Battalion Imperial Yeomanry, but I think perhaps a few further particulars in connection with this case may be of interest, as showing that the appointment was not influenced by any difficulty in obtaining a qualified man.

The 12th Battalion Imperial Yeomanry consists of one Company of selected men from the East Kent Yeomanry Cavalry, two Companies from the Middlesex Y.C., and one Company from the West Kent Y.C., each Company completing its complement by specially enlisting the required number of civilians. My brother, Mr. Thomas Hibbard, M.R.C.V.S., has been a member of the last-named regiment for about ten years, and a N.C.O. for the greater part of that time, and volunteered for active service with the Imperial Yeomanry immediately the opportunity occurred. He was accepted, and thereupon applied for the appointment of veterinary officer to the Battalion, both through his Company Commanding Officer and directly to the headquarters of the Imperial Yeomanry.

In the words of Mr. Sewell "he (my brother) is a very energetic man and did a lot of good professional work amongst the horses of his Company, and I have no doubt his Commanding Officer duly noted this," and subsequently strongly recommended him for the appointment to the officer commanding the Battalion, but without success.

My brother qualified in 1888, and has been in constant practice ever since until his departure for South Africa.

Mr. Wallace may be, as Mr. Sewell suggests, a very estimable man, but so is my brother, and his friends were extremely surprised to know, through the medium of *The Veterinary Record*, that an unqualified man was selected under the circumstances in preference to him —I am, sir, your obedient servant,

H. HIBBARD, Lieut., (Retired)
Late Riding Master 1st Life Guards.

READY-MADE MEDICINES.

Sir,

In looking over some of my old *Veterinary Records* I noticed a letter from one I suppose to be a veterinary surgeon and signs his name "Nostrum."

Now these nostrums, so-called, I find very useful, and no doubt at any time a V.S. writes to the manufacturers I feel sure they will give him the active principles.

There are two classes that do not require nostrums, one, a practitioner who has a practice not large enough to fully occupy his time (which no doubt my friend is one of that class), and another who keeps an assistant. For my own part, at certain periods of the year, I purchase these nostrums, and some from the firm mentioned by my friend. I find they give me satisfaction. But when I look at their list I also discover they are manufactured by one of our cloth, and the firm is only an agent.

I know there are many quack medicines which are supplied to our customers, but when a firm only sell to our profession certain lines surely we cannot grumble.—Yours truly, LIVE AND LET LIVE.

SHOULD WE GIVE PRESCRIPTIONS?

Sir,

A late experience must be my excuse for troubling you with a short account of same, and I hope we may obtain the opinion of members on a subject which is "a sign of the times." A client objected to the charges of 2s. 6d. per dozen of tonic powders, and 2s. a bottle for lotion, neither of which appears excessive, and stated "he would insist on having prescriptions in future and have them filled at his chemist." To this I objected; first on the grounds that I did not approve of chemists obtaining and making further use of my prescriptions; secondly, it was not fair that chemists should reap the profits which should go to the veterinary surgeon. Result: Loss of a client, and less trouble.—Yours truly, "TONIC."

SANITARY INSTITUTE.

Sir,

When "AN F.R.C.V.S." further degrades the title by prefixing his name, which I surmise is not a polite one, I shall reply to his most gentlemanly (?) production in your last issue.—Yours faithfully,

W. J. MORAN, F.R.C.V.S.

AN ANCIENT SIGN.

Sir,

To the recent action against Mr. H. J. Danks, Moseley, Salop (reported in your paper) may probably be attributed the disappearance of what was perhaps the most quaintly worded professional sign ever exhibited, it ran as follows:—

H. DANKS,
Veterinary Surgeon.
Beast Leech, Castrator, and Spayer.

It was, I believe, the sign of the present Mr. Danks' father.—Yours truly,

R. H. MERRETT.

March 22nd.

COMMUNICATIONS, BOOKS, AND PAPERS RECEIVED—Professor James McCall, Lieut. Hibbard, Messrs. W. Awde, J.A.Bull, S. Jackson. W. J. Moran, Gerald Bloxsome, "Nosilums," "Buck Jumper," "Tonic."
Kentish Express and Ashford News, The Morning Post.

Veterinary Societies—Addresses.

Alterations for this list must be duly notified by the Secretaries

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Hon. Sec: Mr. E. Lionel Stroud, M.R.C.V.S.,
29 Spring-st., Hyde Park, W.
Meetings, First Thursday in each month, except August and September, 10 Red Lion Square, Holborn, at 7 p.m.

CENTRAL V.A. OF IRELAND.
Pres. Mr. W. A. Byrne, M.R.C.V.S., Roscommon
Hon. Sec. & Treas: Mr. M. J. Cleary, M.R.C.V.S., Mullingar

EASTERN COUNTIES V.M.A.
Pres: Mr. F. W. Wragg, F.R.C.V.S. Whitechapel, London, E.
Hon. Sec.: Mr. F. B. O. Taylor, M.R.C.V.S.
Weston Longville, Norwich
Meetings, Second Tuesday, Feb. and July

GLASGOW V.M.S.
Pres. Principal McCall.
Hon. Sec. Mr. R. G. Anderson.

VET. MED. ASSN. OF IRELAND.
Pres: Mr. M. Hedley, F.R.C.V.S.
Privy Council Office, Dublin Castle
Hon. Sec. Mr. J. McKenny, M.R.C.V.S.
116 Stephens-green-west, Dublin

LANCASHIRE V.M.A.
Pres: Mr. Jos. Abson, F.R.C.V.S., Norfolk-st, Sheffield
Hon. Sec: Mr. Harry Locke, M.R.C.V.S.
Grosvenor Street, Oxford Street., Manchester
Meetings, 1st Thursday in March, June, Sept., & Dec.

LINCOLNSHIRE V.M.S.
Pres: Mr. James Smith, M.R.C.V.S., Huntingdon
Hon. Sec: Mr. E. C. Russell, M.R.C.V.S., Grantham
Meetings, Second Thursday, Feb., June and October

MIDLAND COUNTIES V.M.A.
Pres: Mr. H. J. Dawes, F.R.C.V.S.,
Camden House, High St., West Bromwich
Hon. Sec: Mr. John Malcolm, F.R.C.V.S.
Holliday Street Wharf, Birmingham
Meetings, Second Friday in Feb. & May.
Second Tuesday in August, November

NATIONAL VET. ASSOCIATION.
Pres: Mr. M. Hedley, F.R.C.V.S.,
Privy Council Office, Dublin Castle
Sec: Mr. William Hunting, F.R.C.V.S.
Treas: Mr. F. W. Wragg, F.R.C.V.S., Whitechapel, London.

NATIONAL VETERINARY BENEVOLENT & MUTUAL DEFENCE SOCIETY.
Pres: Mr. Geo. Morgan, F.R.C.V.S., 95 Stanhope-st. Liverpool
Treas: Mr. E. Faulkner, F.R.C.V.S., Manchester
Hon. Sec: Mr. Sam. Locke, M.R.C.V.S.
Grosvenor Street, Oxford-st., Manchester

NEW SOUTH WALES V.M.A.
Pres: Mr. John Stewart, H. AND A.S.
Vice: Mr. John Pottie, H. and A.S.
Hon. Sec. & Treas: Mr. J. D. Stewart, M.R.C.V.S.

NORTH OF ENGLAND V.M.A.
Pres: Mr. J. W. T. Moore, F.R.C.V.S., Jarrow-on-Tyne.
Hon. Sec: Mr. H. S. Elphick, M.R.C.V.S.
Newgate-street, Newcastle-on-Tyne
Meetings, Third Friday, Feb., May, Aug. and Nov.

NORTH OF SCOTLAND V.M.S.
Pres: Mr. Adam Sievwright, M.R.C.V.S.,
Tarland, Aberdeenshire
Hon. Sec: Mr. William McPherson, M.R.C.V.S., Huntly

ONTARIO V.A.
Pres: Mr. G. L. Robson.
Sec: C. H. Sweetapple, Toronto.

ROYAL COUNTIES V.M.A.
Pres: Mr. S. H. Slocock, F.R.C.V.S., Hounslow
Hon. Sec: Mr. E. P. Owen, M.R.C.V.S., 98 High-st. Thame
Meetings, Last Friday, Feb., June and Nov.

ROYAL SCOTTISH V.S.
Pres: Mr. Reid, M.R.C.V.S., Auchtermuchty.
Hon. Sec: Mr. W. D. Fairbairn, M.R.C.V.S., Cupar, Fifeshire

ROYAL VETERINARY COLLEGE M.A.
Pres: Prof. Hobday.
Hon. Sec: Mr. Clement E. Rix, R. V. Coll.
Assist. H.S. Mr. John Hobday, R.V.C., Camden Town, N.W.

SCOTTISH METROPOLITAN V.M.S.
Pres: Mr. Andrew Boyd, F.R.C.V.S., Melrose
Hon. Sec: Mr. P. Moir, M.R.C.V.S., 9 Kilmain Terr. Edinbro

SOUTH DURHAM AND NORTH YORKSHIRE V.M.A.
Pres.: Mr. J. H. Taylor, M.R.C.V.S., Darlington
Hon. Sec: Mr. W. Awde, F.R.C.V.S., Stockton-on-Tees.
Meetings, First Friday, Mar., June. Sept. and Dec.

SOUTHERN COUNTIES V.M.S.
Pres: Mr. J. B. Tutt, F.R.C.V.S, Winchester
Hon. Sec: Mr. C. Pack, M.R.C.V.S., Lymington, Hants
Meetings, Last Thursday, Mar., June and Sept.

SOUTH WALES AND MONMOUTHSHIRE V.M.A.
Pres: Mr. E. Sayer, M.R.C.V.S., Newport, Mon.
Hon Sec. Mr. D. G. Davies, M.R.C.V.S., High-st, Swansea
Treas. Mr, E. Sayer, M.R.C.V.S., Newport, Mon.
Meetings First Thursday in March, and Autumn.

WESTERN COUNTIES V.M.A.
Pres: Mr. P. G. Bond, M.R.C.V.S., Plymouth
Hon. Sec: Mr. John Dunstan, M.R.C.V.S. St. Mellion, Cornwall
Meetings, Third Thursday, March, July and November

WEST OF SCOTLAND V.M.A.
Pres: Dr. James McIntosh McCall, Vety. Coll. Glasgow
Hon. Sec: & Treas: Mr. J. Bishop, M.R.C.V.S.,
754 Garscube Road, Glasgow

YORKSHIRE V.M.A
Pres Mr. M. Robinson, M.R.C.V.S. Barnsley
Hon. Sec; Mr. A. McCarmick, M.R.C.V.S., Kirkstall-rd, Leeds
Meetings, Last Friday in Jan., April, and October.